THIS ISSUE:

Results from our ocean acidification trials
Planktonauts prepare for Fiji aid mission
River doctors treating our waterways

And more…
Medical approach to river health

Freshwater Group Manager
Dr Roger Young has published a paper advising there is much to be learned from the medical practice when considering ecosystem management. The paper titled "River doctors: Learning from medicine to improve ecosystem management", recommends ‘river doctors’ gather information about a waterway, provide a diagnosis, and apply treatment. It also highlights the importance of following up with regular monitoring and prevention based on what has been learned.

Dr Young said, "New Zealand rivers would certainly benefit from better diagnostics and monitoring. Currently we know when something is wrong with a river, but it’s difficult to pinpoint what exactly, and there’s very little post-treatment monitoring, so it’s hard to know what is and isn’t working. Medical science and practice has developed over millennia. The framework used to diagnose, treat, monitor, and prevent disease provides an excellent template for river management."

The paper is the result of an international collaboration between Prof. Arturo Elosegi from Spain, Prof. Mark Gessner from Germany, and Dr Young from New Zealand. The freshwater ecologists spent a week working together at the Leibniz-Institute of Freshwater Ecology and Inland Fisheries in Germany. Here they workshoped the idea that the medical profession’s approach to human health could hold the key to understanding and improving ecosystem conditions.

Dr Young has been encouraged by the public interest in New Zealand’s rivers and said, "It takes a combined community effort to improve river health."

Science transcends borders

Cawthron staff travel around the world to share their expertise and remain across developments in their field.

Scientific conferences provide an opportunity for attendees to present their work, discuss their findings, network with potential collaborators, and build enduring relationships with their peers. Recently a six-strong team attended the International Conference & Workshop on Lobster Biology and Management in Maine, United States. Here each of the six presented an aspect of the advances and discoveries they’re making through Scampi research.

In Galway, Ireland, Cawthron delegates participated in the International Conference on Molluscan Shellfish Safety (ICMSS). Dr Tim Harwood was one of the delegates and said, "It was great to see the international conference was well attended by New Zealand industry, regulators, and science providers. By attending these events, we remain across relevant seafood safety issues and emerging trends."

Cawthron’s bioactives team have also been exchanging ideas on the world stage, with representatives at conferences in Europe and the United States. The knowledge gained will strengthen this exciting area of research, and support the growth of New Zealand’s bioactives industry.

Cawthron regularly connects domestic and international expertise through world-class workshops and meetings. Experts from around the world visit the Institute to work with their scientists. The recent Salmon FCE technical advisory group meeting was well attended, with many international scientists visiting Nelson. The research programme is tailored for the king salmon farm environment, so the group visited a farm in the Marlborough Sounds. Prof. Tim Dempster from the University of Melbourne, School of BioSciences participated in the field trip and said, “It was excellent to experience a New Zealand salmon farm environment first-hand. This programme is a great opportunity for scientists to learn more about the king salmon species and I’m looking forward to reviewing the research outcomes.”

Cawthron also hosted some of New Zealand’s international marine biosecurity partners at the application of high-throughput sequencing (HTS) tools to marine biosecurity surveillance workshop. Through this workshop they considered how exciting molecular (DNA/RNA) technologies might strengthen invasive species surveillance in the marine environment. Cawthron marine phylogeneticist and workshop Chair Dr Xavier Pochon said, “The workshop brought together leading scientists from Canada, USA, Australia, and New Zealand.”

Through international meetings we form enduring partnerships for the benefit of New Zealand.
Strong mussels inherit ocean acidification resilience

Cawthron researchers have been conducting ambitious breeding trials to determine how the iconic Greenshell™ Mussel species will respond to ocean acidification. Preliminary findings from the trials indicate certain mussel families are more likely than others to survive predicted ocean acidity changes.

Dr Norman Ragg leads the trials and is pleased to report they have been remarkably successful. “Preliminary analysis of our trial data suggests different families have varying resilience to ocean acidification during the fragile early life stages. This means there’s genetic potential within the New Zealand mussel populations to adapt to rapid acidity changes,” said Dr Ragg.

Ocean acidification is a worldwide climate change phenomenon. As the level of carbon dioxide in the atmosphere increases, the acidity of seawater around the world is slowly increasing. Through their trials, Dr Ragg and his team have discovered this pH change makes it difficult for young mussels to grow their hard shells, meaning some will not survive the vulnerable first 48 hours of life. However, the breeding trials show some offspring are blessed with a stronger innate resilience, inherited from their parents.

The research team have also been studying whether the experiences of adult mussels are reflected in the resilience of their progeny; interestingly there does appear to be a correlation. Results from the parent acidification trials suggest adult mussels who experienced relatively more acidic seawater, have more tolerant offspring than adults without this exposure.

These trials are part of the wider Ministry of Business, Innovation and Employment (MBIE) funded project, Coastal acidification - rate, impacts and management (CARIM). The project aims to develop ocean acidification knowledge to enhance the protection and management of New Zealand coastal ecosystems. CARIM is a NIWA-led collaboration, which includes partners Cawthron, University of Auckland, and University of Otago.

Queen’s Birthday Honours

Cawthron’s Dr Lesley Rhodes was named in the Queen’s birthday Honours list as Companion of the New Zealand Order of Merit (CNZM) for services to science and marine farming.

In acknowledgement of receiving the honour, she said, “This was completely unexpected and is definitely a tribute to the Cawthron team. The research I’m involved in brings together scientists with expertise in many different fields so any successes for our ‘Seafood Safety’ programme are a joint effort.”

The Honours list recognises people who contribute outstanding community service and whose achievements enhance national identity. Dr Rhodes is one of New Zealand’s pre-eminent scientists with a distinguished career, spanning over 30 years at Cawthron Institute. Her work’s revolutionised the management of marine algal blooms and biotoxins in shellfish domestically and overseas.

Planktonaut training

Oceanic plankton (small drifting plants and animals) play a major role in sustaining life on our planet. They generate half of the oxygen we breathe, help regulate our climate, and provide a key indicator of climate change.

Cawthron scientist Dr Xavier Pochon has prepared young sea cadets with ‘planktonaut’ training, ahead of their Plankton Planet aid mission to Fiji. Dr Pochon said, “We’ve catalogued thousands of plankton species, but since the ocean is so vast and underexplored, there’s a real possibility the sea cadets might discover a new species.”

Cawthron Institute supports Plankton Planet, an international science programme which is increasing our knowledge of plankton by equipping citizen sailors (planktonauts) to collect samples while navigating the high seas.

The samples are dried and sent to expert laboratories for testing. Here, they are measured for plankton biodiversity through mass sequencing of DNA barcodes. This technology has opened up a new view into the world’s oceans.

The cadets will stop en route to Fiji to participate in the Plankton Planet youth outreach at the Maritime Museum of Auckland. This outreach day is part of a 6-day workshop organised by Dr Pochon to bring together international researchers to discuss the applications possible with the help of planktonauts. The workshop is supported by New Zealand Royal Society, Cawthron Institute, Sir Peter Blake Trust, and Auckland Maritime Museum.

Queen’s Birthday Honours

Cawthron’s Dr Lesley Rhodes was named in the Queen’s birthday Honours list as Companion of the New Zealand Order of Merit (CNZM) for services to science and marine farming.

In acknowledgement of receiving the honour, she said, “This was completely unexpected and is definitely a tribute to the Cawthron team. The research I’m involved in brings together scientists with expertise in many different fields so any successes for our ‘Seafood Safety’ programme are a joint effort.”

The Honours list recognises people who contribute outstanding community service and whose achievements enhance national identity. Dr Rhodes is one of New Zealand’s pre-eminent scientists with a distinguished career, spanning over 30 years at Cawthron Institute. Her work’s revolutionised the management of marine algal blooms and biotoxins in shellfish domestically and overseas.

Planktonaut training

Oceanic plankton (small drifting plants and animals) play a major role in sustaining life on our planet. They generate half of the oxygen we breathe, help regulate our climate, and provide a key indicator of climate change.

Cawthron scientist Dr Xavier Pochon has prepared young sea cadets with ‘planktonaut’ training, ahead of their Plankton Planet aid mission to Fiji. Dr Pochon said, “We’ve catalogued thousands of plankton species, but since the ocean is so vast and underexplored, there’s a real possibility the sea cadets might discover a new species.”

Cawthron Institute supports Plankton Planet, an international science programme which is increasing our knowledge of plankton by equipping citizen sailors (planktonauts) to collect samples while navigating the high seas.

The samples are dried and sent to expert laboratories for testing. Here, they are measured for plankton biodiversity through mass sequencing of DNA barcodes. This technology has opened up a new view into the world’s oceans.

The cadets will stop en route to Fiji to participate in the Plankton Planet youth outreach at the Maritime Museum of Auckland. This outreach day is part of a 6-day workshop organised by Dr Pochon to bring together international researchers to discuss the applications possible with the help of planktonauts. The workshop is supported by New Zealand Royal Society, Cawthron Institute, Sir Peter Blake Trust, and Auckland Maritime Museum.
Students experiment with aquaculture science

Over 200 biology students swapped textbooks for lab coats to gain practical science experience at the Cawthron Aquaculture Park as part of Year 13 mussel biology workshops.

The workshops offer secondary school students the opportunity to gain NCEA credits by conducting self-led experiments with mussels in state-of-the-art Nelson Marlborough Institute of Technology (NMIT) laboratory facilities. The initiative is the result of a collaboration between NMIT, SpatNZ, Otago University, and Cawthron Institute.

This year, Nelson College participated after science teacher Johnnie Fraser advocated for his school’s involvement. Mr Fraser previously spent six months with Cawthron under a Royal Society placement. Through this, he recognised the value students gained from the workshops and wanted his students to take up the opportunity.

“It’s so great for senior biology students to meet scientists in an informal situation to discuss their investigations, and to hear from the scientists the pathways that led them to their work. Connecting the Cawthron science and scientists, with local industry, and the courses available at NMIT and Otago University is a precious thing for high school science students,” said Mr Fraser.

During their time at the Cawthron Aquaculture Park, students visit SpatNZ’s premises where they discover how spat breeding works, and learn how New Zealand’s aquaculture value has increased through research and innovation. The programme has real world results. Hannah Coote participated in the workshop as a year 13 student and became inspired to study aquaculture at NMIT; having completed her diploma, Hannah is now a valued SpatNZ employee.

Community educator Cristina Armstrong explained the workshops are part of Cawthron’s activities aimed at disseminating science and knowledge in the broad environmental field.

Cawthron Foundation actively engages with its local community by providing education activities, supporting PhD study through internships, sponsoring students and providing public lectures. Each year around 600 young people between 4 and 18 years participate in one or more of the Cawthron delivered education programmes.